

**Teachability and Learnability across languages**

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**Title:** Research Timeline. The Role of Instruction: Teachability and Processability

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# Research Timeline

## The Role of Instruction: Teachability and Processability

The present chapter presents a research timeline on the role of instruction, with particular reference to the teachability hypothesis (Pienemann, 1984). The format of a research timeline is adopted from the journal *Language Teaching*, which has published a number of timelines on several key concepts in SLA. The most recent research timeline was, for example, on second language communication strategies (Kennedy & Trovimovich 2016). The purpose of a research timeline is to graphically summarize the main thoughts and findings in the history of a particular aspect together with the representative bibliographical references. It provides the historical context and the development of a particular idea.

Applied to the teachability hypothesis, the aim of the timeline in this chapter is twofold: (i) to present a historical, bigger-picture-background to the teachability hypothesis, i.e. what knowledge was available in the field of SLA back then, which led to the formulation of the teachability hypothesis; and (ii) to give an overview of the findings of teachability studies, which will enable the reader to evaluate the claims made by the teachability hypothesis. In order to highlight how the field has evolved, SMALL CAPITALS indicate when an entry refers to previous work or has stimulated later work mentioned in the timeline. The timeline contains 30 entries which can be considered as the key studies in relation to the teachability hypothesis.

Before presenting the timeline, let us first briefly introduce the question of the role of instruction. This question has always been one of the main concerns in the field of Second Language Acquisition (SLA). To determine whether grammar instruction is effective, the SLA field has, in general, examined three aspects (Spada & Lightbown, 2013):

- How effective is teaching in terms of L2 proficiency levels or levels of ultimate attainment?
- How effective is teaching when compared to natural exposure? Does teaching of grammar alter the rate of acquisition?
- In the same vein, can teaching of grammar alter the route of acquisition?

This chapter presents a research timeline that will focus on the last aspect, i.e., how effective is instruction in advancing learners along the natural route of acquisition? This question obviously implies that there is a natural route in the first place. Indeed, in SLA, it is an established finding that learners follow predictable paths with predictable stages in the acquisition of a given structure (see Abrahamsson, 2013; Meisel, 2013; VanPatten & Williams, 2014). In the early days of SLA, the majority of studies reported the same order of acquisition for grammatical morphemes and the same sequence for syntactic structures with both naturalistic and instructed learners. In other words, instructed learners were not able to go against the natural developmental route. This finding led Pienemann (1984) to propose the teachability hypothesis, which stated that instruction is constrained by development, and as such, that stages of SLA cannot be skipped through formal intervention. It was

hypothesized that “an L2-structure can only be learned by instruction if the learner’s Interlanguage is close to the point when this structure is acquired in the natural setting” (Pienemann, 1984: 198). In other words, the teachability hypothesis is based on the idea that learners will learn what they are taught only if they are developmentally ready for it.

This concept of developmental readiness is omnipresent in the field of instructed SLA. In the research on Form-Focused Instruction (FFI), for example, developmental readiness is often used to explain the individual learner differences when the effects of various types of instruction are examined. It appears that gains in terms of proficiency level especially occur with learners who are ready for the taught form or who already had partial mastery of the form (Williams & Evans, 1998: 151). The research on FFI relates, however, to the first aspect mentioned above and deals with the effectiveness of different types of instruction (such as, explicit/implicit Focus on Form) on L2 proficiency. This kind of research will not be covered in this chapter (for a research timeline on FFI, see Nassaji, 2016). Another related issue that will not be covered in our chapter is the question of the interface (see, e.g., N. Ellis, 2011). This question examines whether and in what way implicit and explicit knowledge (and as such, implicit and explicit learning processes) can interface in L2 language use. Obviously, this question is relevant to the teachability hypothesis and developmental readiness, but in order to clearly delimit the timeline presented in this chapter, we opted for a focus on developmental sequences and developmental constraints. To be clear, the constraints apply to spontaneous language production and not to formulaic or declarative metalinguistic knowledge.

The observed existence of developmental sequences and the assumption of developmental constraints triggered further theoretical thinking to define the constraints and as such to explain the developmental sequences. In 1998 Pienemann proposed his Processability Theory (PT), which explains developmental sequences by means of the learners’ gradually developing capacity to process syntactic information: Learners develop processing routines which are hierarchically ordered. The earlier formulated teachability hypothesis got incorporated into PT. When it comes to the question of application in the L2 classroom, PT and the teachability hypothesis express the view that it might be useful or even necessary to take into account the question of ‘what is learnable?’ in order to improve language teaching. If teachers are aware of what is learnable at a given stage in the development of their learners (or of each individual learner), they may adjust their expectations for language acquisition accordingly.

A number of researchers raised concerns, however, as to whether it is really possible to organize teaching in line with developmental readiness. Dallaway (1994) for example, pointed to the difficulties that can arise in precisely determining the learner’s developmental stage and in constructing a whole morpho-syntactical syllabus this way. Constructing such a syllabus might prove difficult, because, as Lightbown (1998: 179) mentioned, there is research available on only a few syntactic features in English and German and even less of other languages. In addition, the heterogeneity of classrooms conflicts with teaching that targets ‘the next stage’, because not every learner will be at the same stage. Lightbown (1998: 188) fears that adopting readiness as a basis for teaching might cause a return to teaching language features in isolation, which is not supported by any research in SLA (see, e.g., the FFI research). In the same vein, Pica (2007) raised the issue of the limited scope and Ortega (2009: 138) warned for a slavish application possibly resulting in teaching in

isolation again. With their concerns, however, they do not appear to invalidate the claims of the teachability hypothesis on a theoretical level. Despite the difficulties in terms of the possible practical ramification of the teachability hypothesis to actual instructional settings, the main merit of the teachability hypothesis is that it provides teachers and students with realistic knowledge of what to expect as a result of classroom instruction (Loewen, 2014: 79; see also, Long, 1991; Doughty & Williams, 1998: 206).

Some of the concerns have been addressed by PT-researchers. The issue with regard to the determining of a learner's developmental stage was approached by the development of a diagnosing tool, called Rapid Profile (Pienemann, 1992), which can be used by teachers to quickly assign a developmental profile to individual learners (Keßler, 2006; Keßler & Liebner, 2011; but see also earlier: Mackey et al., 1991). With regard to the other issue of constructing developmentally moderated syllabi taking into account the reality of heterogeneous classrooms, PT-researchers made a plea for task-based language teaching (TBLT) methods, because these are well suited to present to each individual learner the right input adjusted to her/his individual developmental stage (Keßler, 2008; Pienemann & Keßler, 2012). These more practical issues will, however, not be discussed in the timeline. Instead, our timeline will focus on the more theoretical SLA perspective concerning the effect of formal instruction on the route of acquisition. We will use three theme labels:

- papers discussing the route of acquisition (either morpheme orders, or syntactic sequences): theme A;
- papers dealing with the effects of formal instruction in relation to developmental sequences in general: theme B;
- papers testing the teachability hypothesis in particular: theme C.

YEAR	REFERENCES	ANNOTATIONS	THEME
1967	Corder, S.P. (1967). The Significance of Learner's Errors. <i>International Review of Applied Linguistics in Language Teaching</i> , 5, 161-170.	The beginning of SLA as a field is usually traced back to Corder, who formulated the idea of a 'built-in syllabus'. According to this idea, learners were said to pass through a learner-generated sequence with systematic errors (and also random errors, as a matter of fact) at every point in the development, giving evidence of a system of transitional competence. The notion of a built-in syllabus set the stage for the young field of SLA to accumulate an extensive body of research on developmental patterns. Several terms were used to denote the systematic, yet variable ways in which the learner constructs his grammar for the new language: 'interlanguage' (Selinker, 1972) is the term still commonly used in the field of SLA.	A
1973	Dulay, H. & M. Burt (1973). Should we Teach Children Syntax? <i>Language Learning</i> , 23, 245-258.	Early empirical evidence of systematic (but unstable) learner language came from the so-called morpheme order studies. These studies reflected the idea of the existence of a built-in syllabus (CORDER, 1967). Dulay and Burt were the first to claim that a natural order exists for L2 English morphemes, based on their study of Spanish and Chinese-speaking children learning English. Using suppliance in obligatory contexts as acquisition criterion, they found, for example, that the plural -s is one of the first morphemes to be mastered, whereas the possessive -s is one of the last. In relation to the question 'what is the role of instruction?', the establishment of a natural order of acquisition led to the belief that the teaching of syntax should be abandoned, because learners will pass through the same natural order anyway.	A
1975	Valdman, A. (1975). Error analysis and grading in the preparation of teaching materials. <i>The Modern Language Journal</i> , 59, 422-426.	Instead of abandoning the teaching of syntax (DULAY & BURT, 1973), Valdman proposed to take the natural order as the basis for syllabus design. In an experiment where the different types of French WH-questions were instructed he found that learning was successful when the teaching material was graded in line with possible stages of acquisition. Instead of exposing beginning learners of French with 'est-ce que' or inversion, the teaching materials in the experiment were modified so that the first interrogative structure taught was simple fronting (which is not normally used in teaching materials because native speakers qualify	A-B

		<p>it as incorrect). The results showed that the simple fronting was easily learned and in addition facilitated the learning of the more complex structures ('est-ce que' and inversion). This result was interpreted as follows: teaching a structure that a learner can handle facilitates the learning of more complex structures. Valdman therefore proposed to grade the syllabus according to what is easy to acquire. Although promising, the weak point in this proposal was that 'easy' (and the implied 'hard(er)') was not defined in detail. 'Easy' only referred to reduced and/or deviant forms of the linguistic structure.</p>	
1978	<p>Hatch, E. (1978). Apply with caution. <i>Studies in Second Language Acquisition</i>, 2, 123-143.</p>	<p>In a reflection on the possible relationship between SLA research and classroom application, Hatch warned researchers and educators to apply SLA research to practice with caution. She was critical of the proposals (i.e., 'abandon teaching' and 'following the natural order') above, because the morpheme order studies, on which these proposals were based, measured the mean accuracy rates of the linguistic features and equated these accuracy rates with acquisition. Hatch called this a theoretical flaw, which made it ill-founded to apply the morpheme order findings directly to the classroom. Following up on this critique, MEISEL, CLAHSSEN &amp; PIENEMANN (1981) later introduced another criterion to determine 'acquisition', i.e. the so-called 'emergence criterion' (see Pallotti, 2007, for discussion).</p>	B
1979	<p>Schumann, J.H. (1979). The acquisition of English negation by speakers of Spanish. In: R. Andersen (ed.), <i>The acquisition and use of Spanish and English as first and second languages</i> (pp.1-32). Washington DC: TESOL.</p>	<p>Schumann examined the acquisition of L2 English negation by speakers of Spanish and observed four major stages: <i>no</i> + X, <i>no/don't</i> V, aux-neg, and analysed <i>don't</i>. This developmental sequence was found for speakers from different L1 backgrounds. Schumann's study had a significant impact, not only because it demonstrated developmental sequences of negation, but also because it showed the interaction between L1 and developmental sequences. L2 English learners whose L1 has pre-verbal negation (such as Spanish) develop slower between stages 1 and 2 (i.e., the pre-verbal negation stages) than learners whose L1s have post-verbal negation. In addition, regarding the effect of instruction on developmental sequences, Schumann's efforts to make his informant pass from stage 1 to stage 4 through practice in the target forms were largely unsuccessful. Social and psychological distance of the informant towards the target language community were given as possible explanations (Schumann, 1978).</p>	A-B

1981	Meisel, J.M., H. Clahsen & M. Pienemann (1981). On Determining Developmental Stages In Natural Second Language Acquisition. <i>Studies in Second Language Acquisition</i> , 3, 109-135.	Meisel, Clahsen and Pienemann presented a descriptive framework of interlanguage development, which they called the Multidimensional Model. The model assumed that interlanguage development is not linear and instead contains at least two dimensions: steady development on the one hand and interlanguage variation on the other. The Multidimensional Model included an important methodological innovation: The observed stages are based on the notion of emergence or the first productive, non-formulaic use of a particular word order structure. The authors argued that frequency measures (based on the accurate use as supplied in obligatory contexts) lack validity as measures of L2 development, because accuracy rates confuse development with mastery.	A
1983	Krashen, S. & T. Terrell (1983). <i>The Natural Approach. Language Acquisition in the Classroom</i> . Hayward, CA: Alamy Press.	Rather than teaching grammar, Krashen and Terrell suggested a Natural Approach to language learning. This approach relied on the idea of comprehensible input. According to this idea, language acquisition takes place when learners are exposed to language that is comprehensible and that contains $i + 1$ (the $i$ represents the level of language already acquired; the $+1$ the language that is just a step beyond that level). In a sense, the natural approach came down to the same psycholinguistic core as DULAY'S & BURT'S (1973) abandon teaching proposal, only it added that the learner is to be provided with natural, comprehensible input that is slightly beyond students' current level of language development in order for acquisition to be successful. Krashen's approach has been criticized by many SLA researchers (for a critical discussion, see, McLaughlin, 1987). With regard to the issue of developmental readiness, the construct was acknowledged but not empirically testable, because the 'i+1'-formula was not clearly operationalized.	B
1983	Pica, T. (1983). Adult acquisition of English as a second language under different conditions of exposure. <i>Language Learning</i> , 33, 465-497.	In her PhD study, Pica dealt with the question of what might cause the observed order. She investigated the second language development of the plural -s, articles, and progressive -ing among Spanish-speaking learners of English L2. She compared 18 learners, who had experienced different types of exposure: formal classroom instruction ( $n = 6$ ), naturalistic input ( $n = 6$ ), and a combination of these two ( $n = 6$ ). The results showed that the three groups followed a strikingly similar sequence in their acquisition of the articles. For these highly complex grammatical items, instruction appeared to have little effect. Instruction did, however, have an impact on the other two items, both in a positive and a negative way: it accelerated the passing through of the natural sequence for the morphologically simple plural -s, but it decelerated the passing through of the natural	A

		sequence for the linguistically complex progressive <i>-ing</i> . The study showed that instruction does not alter the route of acquisition, but, depending on the complexity of the language item, it can influence the speed of acquisition.	
1983	Long, M. (1983). Does second language instruction make a difference? A review of research. <i>TESOL Quarterly</i> , 17, 359-82.	In a reaction to the proposal of abandoning the teaching of syntax (see DULAY & BURT, 1973), Long reviewed 12 (mainly ESL) studies that dealt with the effect of instruction. Long found considerable evidence indicating that L2 instruction makes a difference. The benefit of instruction compared to programmes of exposure only, was evident for children as well as adults, at different levels of proficiency and in different learning contexts. Long's review of research was important to re-confirm the common-sense assumption that instruction can raise the degree of correctness in the use of L2 structures. It is important to add here that in the reviewed studies, test scores (in other words: accuracy measures) were used as an index for L2 proficiency and L2 development. However, with such an interpretation two theoretical constructs (i.e., proficiency and development) are conflated, instead of treated as two separate constructs (see, MEISEL, CLAHSN & PIENEMANN, 1981; CLAHSN, MEISEL & PIENEMANN, 1983). The effectiveness of instruction in Long's review was, in other words, related to L2 proficiency levels and levels of ultimate attainment and not to the developmental route of acquisition (see the three aspects regarding the effectiveness of instruction distinguished by Spada & Lightbown (2013), mentioned in the introduction to this timeline).	B
1983	Clahsen, H., J. Meisel & M. Pienemann (1983). <i>Deutsch als Zweitsprache: Der Spracherwerb ausländischer Arbeiter</i> . Tübingen: Narr.	<p>A landmark in the search for developmental patterns was the so-called ZISA<sup>1</sup> project, which investigated the second language acquisition of German word order rules by Italian and Spanish immigrant workers. The project led to the formulation of the following implicational sequence:</p> <p>Stage 1 +COS; -IFS    Canonical word order  Stage 2 -COS; +IFS    Adverb preposing (ADV)  Stage 3 -COS; +IFS    Verb separation (SEP)  Stage 4 -COS; -IFS    Inversion (INV)  Stage 5 -COS; -IFS    Verb-end (V-END)</p> <p>Unlike the morpheme order studies, which lacked theoretical motivation, the word order</p>	A



		sequence for L2 German was explained by a set of processing strategies. The two relevant word order strategies were a canonical word order strategy (COS) and an initialization/finalization strategy (IFS).The strategies approach was an explanatory complement to the descriptive Multidimensional Model (MEISEL, CLAHSN & PIENEMANN, 1981). The implicational sequence was later replicated with classroom learners from an L1 English background in the UK (ELLIS, 1989) and Australia (Jansen, 2008).							
1984	Long, M. & C. Sato (1984). Methodological issues in interlanguage studies. In: A. Davies, C. Criper, & A. Howatt (Eds.), <i>Interlanguage</i> (pp. 253-280). Edinburgh: EUP.	<p>The shift in SLA research from orders to sequences was triggered by the severe criticism on the morpheme order studies. Long and Sato identified ten problems associated with the morpheme order studies, three of which will be mentioned here:</p> <ul style="list-style-type: none"> <li>• One main source of criticism is the use of accurate suppliance in obligatory contexts (thereby lumping together different contexts, functions and uses of a given morpheme). Such an analysis rather reveals mastery of a form instead of separate developmental sequences (see MEISEL, CLAHSN &amp; PIENEMANN, 1981; CLAHSN, MEISEL &amp; PIENEMANN, 1983)</li> <li>• Another source of criticisms relates to the use of group mean scores (see HATCH, 1978; LONG, 1983). Two limitations derive from this: first, it does not take individual variation into account; second, it cannot show the individual development.</li> <li>• The morpheme order studies were “goal-oriented and so missed transitional stages in development. [They] looked at the order in which morphemes ‘cross the finishing line’, which may not be the order in which they first appear and/or develop prior to that moment.” (260)</li> </ul>	A						
1984	Hyltenstam, K. (1984). The use of typological markedness conditions as predictors in second language acquisition: The case of pronominal copies in relative clauses. In R. Andersen (Ed.), <i>Second languages: A crosslinguistic perspective</i> (pp. 39-60). Rowley, MA: Newbury House.	<p>Developmental sequences found for word order (CLAHSN, MEISEL, PIENEMANN, 1983) have been explained through processing strategies. For other areas of the grammar, such as relative clauses, typological markedness, more specifically, the Noun Phrase Accessibility Hierarchy (NPAH) (Keenan &amp; Comrie, 1977), has been put forward as a possible explanation for the developmental process. The NPAH predicts the relativizability of a grammatical function and looks as follows (examples from Ellis 1994: 102):</p> <table> <tr> <td>SU</td> <td>The man who lives next door</td> </tr> <tr> <td>DO</td> <td>The man whom I saw</td> </tr> <tr> <td>IO</td> <td>The man to whom I gave a present</td> </tr> </table>	SU	The man who lives next door	DO	The man whom I saw	IO	The man to whom I gave a present	A
SU	The man who lives next door								
DO	The man whom I saw								
IO	The man to whom I gave a present								

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OBL/PP	The man about whom we spoke
GEN	The man whose wife had an accident
OCOMP	The man that I am richer than

If a language can relativize on a position on the hierarchy, then it follows that any other higher position can also be relativized on. Translated to SLA, the prediction was that L2 learners would find relative clauses higher on the hierarchy (i.e., those that are less marked) easier to acquire. As such, the NPAH predicts the acquisitional sequence for relative clauses. Hyltenstam looked into the acquisition of Swedish as a second language by speakers of Finnish, Greek, Persian, and Spanish. He found that the development of relative clauses was consistent with what was predicted by the NPAH (even though the first languages obviously had some influence on the learners' production of Swedish relative clauses).

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1984	Pienemann, M. (1984). Psychological constraints on the teachability of languages. <i>Studies in Second Language Acquisition</i> , 6, 186-214.	Pienemann investigated whether instruction can alter the word order sequence of natural acquisition (CLAHSEN, MEISEL & PIENEMANN, 1983). He analyzed L2 German data from 10 L1 Italian children aged 7-9, who were all below stage 4 (inversion, INV). All the learners received the same input and the same teaching intervention. The targeted structure in this experiment was INV (stage 4). Data was collected in several interviews before, between and after two sets of formal instruction that focused on INV. Although the experiment resulted in a boost of formulaic use of the INV structure by all subjects, only those learners who were close to stage 4 during the phase of instruction (i.e., stage 3) actually acquired the INV structure. Pienemann (1984: 198) concluded that "An L2-structure can only be learned by instruction if the learner's Interlanguage is close to the point when this structure is acquired in the natural setting." Pienemann called this the "teachability hypothesis". Pienemann relied on the strategies approach (CLAHSEN, MEISEL & PIENEMANN, 1983) to explain the constrained effect of formal instruction: stages cannot be skipped because of the cumulative nature of the processing strategies.	C
1986	Pavesi, M. (1986). Markedness, discourse modes and relative clause formation in a formal and an informal context. <i>Studies in</i>	Following up on the research on relative clauses (HYLTENSTAM, 1984), Pavesi investigated the possible influence of learning context on the acquisition of English relative clauses. In this study, English relative clauses were elicited from two groups of Italian learners: 48 EFL high school students in Italy and 38 ESL migrant workers in Scotland. Pavesi found	A-B

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	<i>Second Language Acquisition</i> , 8, 38-55.	identical sequences in the two groups (i.e. the instructed and naturalistic context). She concluded that the acquisition order for relative clauses corresponded to the NPAH, irrespective of whether the learners were instructed or not.	
1988	Eckman, F.R., Bell, L. & Nelson, D. (1988). On the generalization of relative clause instruction in the acquisition of English as a second language. <i>Applied Linguistics</i> , 9, 1-20.	This study addressed the teaching of relative clauses, thereby testing again the reliability of the NPAH (see HYLSTENSTAM, 1984; PAVESI, 1986), but, more importantly, also investigating the implications for second language teaching. The study involved 36 ESL students at a US university, who were divided over four groups, which each received one hour of instruction: a first group was instructed in subject relativization, a second group in direct object relativization, a third group in prepositional object relativization, and a fourth group was not instructed in relativization, but a different area of English. The results showed that the third group instructed on the prepositional object experienced the highest gains. The study showed that learners generalize their learning of a higher marked constituent type to the less/lower marked constituent types.	A-B
1988	Pienemann, M., M. Johnston, & J. Brindley (1988). Constructing an acquisition-based procedure for second language assessment. <i>Studies in Second Language Acquisition</i> , 10, 217-243	<p>In this study the emergence criterion and implicational scaling were used to detect stages in the development of questions among 16 immigrant ESL learners. Six stages were observed in the development of question formation in spoken language production. These stages were common to all the learners, even though variation existed within a stage (but never between stages).</p> <ol style="list-style-type: none"> <li>1. Word and fragments with rising intonation</li> <li>2. Canonical word order with rising intonation</li> <li>3. Fronting of a questioning element (<i>wh</i>-word, <i>do</i>, something else)</li> <li>4. Inversion in <ol style="list-style-type: none"> <li>a. <i>Wh</i>-questions with copula</li> <li>b. Yes/no-questions with aux other than <i>do</i></li> </ol> </li> <li>5. Inversion expands to full range of target-like contexts</li> <li>6. Negative questions; question tags; questions in embedded clauses</li> </ol> <p>This sequence of questions in L2 English has provided the foundation for numerous studies on the topic, e.g., SPADA &amp; LIGHTBOWN (1999) and MACKEY (1999), among others.</p>	A

1989	Ellis R. (1989). Are Classroom and Naturalistic Acquisition the Same? A Study of the Classroom Acquisition of German Word Order Rules. <i>Studies in Second Language Acquisition</i> , 11, 303-328.	This study built on previous studies that had reported on the acquisition of German word order rules in a naturalistic setting (CLAHSEN, MEISEL, PIENEMANN, 1983) and in a classroom setting (PIENEMANN, 1984). The replication study by Ellis using 39 adult learners of L2 German in higher education in Britain was intended to further test the hypothesis that formal instruction does not alter the sequence of acquisition. The results showed that despite instruction the sequence with these adult learners was similar to the one obtained with learners in a naturalistic setting as well as the one obtained with children. The adult learners followed the same sequence, even though the order of introduction to the word order rules and the emphasis given (i.e., some learners received more instruction in the verb-end rule, while others received more instruction in the particle rule) was different. The same sequence was later also observed in Jansen (2008), involving 21 learners of German in Australia. The difference between the learners in a naturalistic setting (CLAHSEN, MEISEL, PIENEMANN, 1983) and classroom learners (Ellis, 1989; Jansen, 2008) is that the instructed learners progress faster.	B
1991	Doughty, C. (1991). Instruction does make a difference. <i>Studies in Second Language Acquisition</i> , 13, 431-469	Apparently contradictory results to the teachability hypothesis were found in Doughty's study, which examined the teaching of relative clauses. The study dealt with the effectiveness of type of instruction (rule-oriented vs. meaning-oriented, compared to a control group with exposure only) and the effectiveness of teaching marked structures. The latter concerned the NPAH and questioned whether acquisition of harder ('marked') structures would facilitate acquisition of easier structures. Of the 20 ESL learners, 6 had not acquired any type of relative clauses, while 14 had acquired subject relative clauses, but not the other types. The instructional treatment involved the relativization of a prepositional object (OBL/PP). Doughty found that both experimental groups improved significantly. So, both types of instruction were equally effective. Interestingly, however, the instruction in a more marked type of relativization had a positive effect on the marked type that had been taught but also on the easier types that had not been taught (see also ECKMAN et al, 1988). These findings suggested that learners are able to skip stages. By focusing on a marked structure the instruction provided an efficient shortcut, because the learners who had begun to acquire the relativization system (for the subject grammatical function) were able to project the rules to the other grammatical functions.	C
The findings were later qualified by Doughty and Williams (1998), who stated that learners			

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were actually able to skip “steps” not “stages” (213). In addition, they argued that the results do not imply that the teachability hypothesis should be ignored and that late-acquired structures be taught first (219). The results only apply to the kind of typological data that is implicationally related (see also ECKMAN et al., 1988), and can therefore not be overgeneralized. In the same vein, PIENEMANN (1998: 261-264) argued that Doughty’s findings based on a markedness hierarchy cannot be compared 1:1 to the findings based on a processing hierarchy. First, the approaches are conceptually different, and second, they use different sets of acquisition criteria (Doughty used a 70% criterion). In addition, PIENEMANN (1998) reasoned that, using the emergence criterion, one would have to conclude that all structures have emerged before the experiment, which was therefore the ideal testing ground for Doughty’s hypothesis that unmarked structures would improve after exposure to marked structures. The experiment was, however, not set up to test the teachability hypothesis.

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| 1995  | Bardovi-Harlig, K. (1995). The interaction of pedagogy and natural sequences in the acquisition of tense and aspect. In: F. Eckman, D. Highland, P. Lee, J. Mileham & R. Weber (Eds.), <i>Second language acquisition theory and pedagogy</i> (pp. 151-168). Mahwah, NJ: Erlbaum. | Support for the teachability hypothesis came from an observational study which investigated the acquisition of tense and aspect. Bardovi-Harlig found that the pluperfect is the last of the past reference forms to emerge. The use of the simple past (with high rates of accuracy) always precedes the emergence of the pluperfect. In this observational study learners who showed a stable use of the simple past and had produced reverse order reports (i.e., reports where the time chronology is not followed because the later action precedes the earlier the in utterance), which is a prerequisite for using the pluperfect, began to use the pluperfect after instruction. The findings were interpreted in line with the teachability hypothesis, i.e., a learner is likely to integrate a linguistic feature targeted by instruction if the prior acquisitional stage has emerged and if instruction is targeted at the next stage. | C   |
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| 1996  | Boss, B. (1996). German Grammars for Beginners: The Teachability Hypothesis and its Relevance to the Classroom. <i>The University of Queensland Papers in Language and Linguistics</i> , 1, 93-100.   | Boss replicated PIENEMANN (1984) in an experiment with eight learners of German in Sydney who were observed in extended oral interaction on two occasions. The study showed that all eight learners progressed in the predicted sequence for German word order (CLAHSEN, MEISEL & PIENEMANN, 1983) regardless of the scheduled teaching. Seven of the eight learners only produced stage 2-structures (ADV) at time1 of the experiment even though stage 4-structure (INV) had been taught before the interview. At time2 four learners had progressed to stage 4 (INV) and one to stage 5 (V-END). The learners who  | A-C |
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		acquired stage 4 (INV) had all acquired stage 3 (SEP) before, and the learner who acquired stage 5 (V-End) had previously acquired stage 3 (SEP) and stage 4 (INV). All of these processes occurred in spite of the scheduled teaching.				
1998	Pienemann, M. (1998). <i>Language Processing and Second Language Development: Processability Theory</i> . Amsterdam: Benjamins	<p>Pienemann developed an explanatory framework for developmental sequences that can be applied to typologically different languages. In doing so, Pienemann rectified limitations of the Multidimensional Model (MEISEL, CLAHSN &amp; PIENEMANN, 1981), which was not falsifiable, as well as of the Strategies Approach (CLAHSN, MEISEL &amp; PIENEMANN, 1983), which was confined to explaining the sequence for word order rules.</p> <p>The basic underlying logic of Processability Theory (PT) is that the learner can only acquire what s/he can process. The processability of a given structure is determined by the hierarchy of processing procedures that become activated during the grammatical encoding of a message (see Levelt's (1989) model of language production). Native speakers activate these processing procedures automatically, language learners have to develop them in a step-by-step fashion. The first step in the sequence of processing procedures is to activate a lemma, including its syntactic category (N, P). Then a phrase can be built (NP, PP). Next, the phrase has to be assigned a grammatical function, which calls up a sentence procedure and eventually, if applicable, a subordinate clause procedure. These stages are acquired in implicational order, and each stage in the hierarchy serves as a necessary prerequisite for the next higher stage. To assure universal applicability of the above processing hierarchy to language acquisition, PT relies on Lexical-Functional Grammar (Bresnan, 2001). Key concepts in this theory of grammar are (i) feature unification and (ii) mapping. Feature unification involves the matching of grammatical information (e.g., in the noun phrase 'two dogs', the information for 'plural' matches). Mapping processes cover the relationship between argument structure, functional structure and constituent structure (e.g., a linear mapping of agent onto subject in a sentence's initial position). According to PT, learners develop from no feature unification, to feature unification within phrases, across phrases and, finally, across clauses. In terms of mapping, PT assumes a development from linear mapping to non-linear mapping.</p>	A-C			
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		<table><tr><td>Processing procedures</td><td>Feature unification</td><td>Mapping</td></tr></table>	Processing procedures	Feature unification	Mapping	
Processing procedures	Feature unification	Mapping				

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5. Subordinate clause procedure (if applicable)	Across clauses	
4. Sentence procedure	Across phrases	Non-linear (e.g., topicalisation)
3. Phrasal procedure	Within phrases	
2. Category procedure	No	Linear (e.g., canonical word order)
1. No procedure (lemma access)	No	

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In the 1998 book, the teachability hypothesis (PIENEMANN, 1984) was re-accounted for in terms of PT. The teachability hypothesis stated that (i) stages of acquisition cannot be skipped through formal instruction, and that (ii) instruction will only be beneficial if it focuses on structures from the next stage. Pienemann related the first part of the hypothesis to the implicational nature of the processing procedures, whereby each stage requires processing prerequisites which are developed at the previous stage. On the second part of the hypothesis Pienemann became more cautious, in that he argued that the presence of the necessary processing procedures does not guarantee that the structure will emerge.

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1999	Spada, N. & P. Lightbown (1999). Instruction, first language influence and developmental readiness in second language acquisition. <i>The Modern Language Journal</i> , 83,1-22	This study tested the teachability hypothesis (PIENEMANN, 1984, 1989) using the stages for English questions forms developed by PIENEMANN, JOHNSTON, & BRINDLEY (1988). Spada & Lightbown exposed French-speaking learners who were at stage 2 (SVO + raising intonation) or 3 (fronting) to Stage 4 and 5 questions (i.e., wh-Q with copula BE, Y/N-Q with AUX, wh-Q with AUX). The results for the oral production task showed that of the stage2-learners (the “unready” learners) 68% did not change, while 29% went up one stage; of the stage3-learners (the “ready” learners) 56% did not change, while 26% went down one stage and 18% went up one stage. These findings did not fully support the teachability hypothesis: learners who were ready to advance to stage 4 tended not to do so, while learners who were not ready did benefit from instruction. However, in agreement with the teachability hypothesis, the study found that most students did not skip stages (in fact, only 2 of 144 students skipped a stage, as they went from stage 2 to stage 4). In other words, most learners did move forward (if they moved forward) according to the sequence	C
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		proposed by PIENEMANN, JOHNSTON & BRINDLEY (1988). Analogous to DOUGHTY (1991), this study showed that advanced input can also serve at least some of the students at lower levels. However, when these students at lower levels profit from more advanced levels of instruction, they still progress through the same developmental sequence without skipping stages.	
1999	Mackey, A. (1999). Input, Interaction, and second language development: an empirical study of question formation in ESL. <i>Studies in Second Language Acquisition</i> , 21, 557-587	This study also took the PIENEMANN, JOHNSTON & BRINDLEY (1988) research as a reference point. The main question of this study was whether conversational interaction can facilitate second language development? More specifically, the study investigated the effectiveness of interactional feedback (recasts) by examining the learners' progression through the developmental stages of English question formation. 34 Adult ESL learners of varying L1 backgrounds were divided into four experimental groups and one control group: one experimental group received premodified input (the "scripteds"), one group participated in natural interaction (the "interactors"), one group also participated in natural interaction, but had low developmental status (the "interactor unreadyies"), and one group observed the interaction without participating in it (the "observers"). Comparing the number of learners who moved up a stage (i.e., Interactors: 5/7; Interactor unreadyies: 6/7; Observers: 4/7; Scripteds: 1/6; Controls: 1/7; or taken together: Interactors 11/14 vs. Non-Interactors 6/20), the study showed that engaging in language interactions facilitates second language development (although the positive effects only appeared in the delayed post-test). Analogous to SPADA & LIGHTBOWN (1999), the study showed that unready learners benefit from instruction (here: interactional feedback) in that they progress to the next stage of the acquisitional sequence, however, without skipping stages.	B
2000	Diehl, E., Christen, H., Leuenberger, S., Pelvat, I. and Studer, T. (2000). <i>Grammatikunterricht: alles für der Katz? Untersuchungen zum Zweitspracherwerb Deutsch</i> . Tübingen: Niemeyer.	In the so-called DiGS-research project <sup>2</sup> , Diehl and colleagues examined whether or not the grammar development of French-speaking learners of L2 German follows fixed developmental sequences. Based on the written language production of 300 pupils in the first year of data collection, and 220 in the second year, the researchers came to the conclusion that sequences indeed exist for word order, verbal morphology and case morphology, but not for gender and number. In addition, the researchers found that the observed developmental sequences could not be changed by instruction. The aim of the DiGS-research project was to discover stages and compare them to the progression of grammar instruction in the GFL-classroom in order to suggest curricular changes. The	A



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project was not intended to justify or falsify a particular SLA theory, and as a result only offers a descriptive account of second language development.

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| 2005  | <p>Mansouri, F. &amp; L. Duffy (2005): The pedagogic effectiveness of developmental readiness in ESL grammar instruction. <i>Australian Review of Applied Linguistics</i>, 28, 81-99.</p>   | <p>The aim of Mansouri's and Duffy's study was to examine whether a specific teaching order based on the concept of developmental readiness could improve learning outcomes. The study focused on the teaching of English word order rules, as accounted for in PT (PIENEMANN 1998: 171). The learners in the study were taught these structures either in the order predicted by PT or in the reversed order (each week a structure from a specific developmental stage was presented). The authors described the predicted order as 'developmentally moderated input'. In relation to the lower level structures (canonical word order, do-fronting) the data of both groups revealed similar patterns of production, only in relation to the highest structure (cancel inversion) the pattern diverged. The accuracy ratio for the highest structure only sustainably improves in the predicted order group. The authors interpreted their results as supporting the teachability hypothesis. It should be noted, though, that (group) accuracy ratios were used instead of the emergence criterion.</p>  | C |
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| 2008  | <p>Di Biase, B. (2008). Focus-on-Form and development in L2 Learning. In: J.-U. Keßler, (ed.), <i>Processability Approaches to Second Language Development and Second Language Learning</i> (pp. 197-219). Newcastle: Cambridge Scholars.</p> | <p>This quasi-experimental classroom study on the development of Italian as a second language in primary school demonstrated the beneficial effects of focus on form on the rate of L2 development. The focus on form instruction as well as feedback in Di Biase's study was developmentally moderated. This means that an experimental group received instruction and feedback which was limited to some targeted structures; a control group received the usual corrective feedback, not limited to the targeted structures. The targeted structures involved two PT stages: stage 2 (category procedure) and stage 3 (phrasal procedures) and correspond in Italian with pluralization on single nouns (stage 2) and plural agreement between adjectives and nouns (stage 3). Before the start of the experiment the pupils were at stage 1 in the PT-hierarchy, which means they basically only had knowledge of some basic vocabulary and some formulaic expressions. The posttest results showed that progress was made in both the experimental and control groups, but the progress was more consistent in the experimental group, in that all learners in this group reached stage 3, whereas this was not the case in the control group, where a number of learners did not even progress and stood still at stage 1. In addition, DiBiase observed that in the experimental group pluralization and plural agreement also emerged in more marked patterns (i.e., depending on the phonological class of a noun).</p> | C |
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		DiBiase concluded that developmentally moderated form-focused feedback is more effective in terms of stage gains and in terms of more accurate use of marked patterns within a stage.	
2012	<p>Bonilla C. (2012) <i>Testing Processability Theory in L2 Spanish: Can Readiness or Markedness Predict Development?</i> Doctoral Dissertation, University of Pittsburgh.</p> <p>See also:</p> <p>Bonilla, C. (2015). From number agreement to the subjunctive: Evidence for Processability Theory in L2 Spanish. <i>Second Language Research</i> 31, 53-74.</p> <p>Bonilla, C. (2015). Instructing stages of Processability Theory in L2 Spanish: Next or next +1? In K. Baten, M. Herreweghe, A. Buyl, &amp; K. Lochtman (Eds.), <i>Theoretical developments in Processability Theory</i>. Amsterdam: Benjamins.</p>	<p>In her doctoral dissertation Bonilla found developmental stages for L2 Spanish morphology and syntax along the lines of the processing prerequisites defined in PT (PIENEMANN, 1998). In two additional pretest-posttest experiments Bonilla tested the claims of the teachability hypothesis and examined (i) whether learners were able to skip stages and (ii) whether instruction is only beneficial when it is geared at the next stage. Experimental groups were given instruction, targeting either the next stage (stage 3), or the next+1 stage (stage 4) and the next+2 stages (stage 5). In relation to the first question, Bonilla found that learners were not able to skip stages. Instruction, in other words, does not alter the developmental sequence. In relation to the second question, however, Bonilla found that the production of target structures increased among the learners who received instruction that was targeted at the next stage, but also among the learners who received instruction that was targeted at the next+1 and the next+2 stages. In fact, instruction targeted at the next+1 and the next+2 stages tended to lead to higher production frequencies in already acquired stages. In other words, instruction does not have to be directed at the next stage in order to be effective. Bonilla interpreted this finding as a refutation of the (second part of the) teachability hypothesis (PIENEMANN, 1984), which originally stated that only instruction on the next stage can aid learners to advance to subsequent developmental stages. Recall that PIENEMANN (1998) became more cautious on this second part of his teachability hypothesis, stating that instruction on the next stage will not guarantee acquisition. In addition, Bonilla's finding is reminiscent of the markedness studies (e.g., ECKMANN ET AL., 1988; DOUGHTY, 1991), which showed that the teaching of a marked item in the NPAH hierarchy was also beneficial to the less marked items in this hierarchy. This pattern is not in contradiction to the teachability hypothesis, however: The teachability hypothesis does not exclude learners to become more proficient (in terms of higher production frequencies or accuracy rates) in the use of structures of already acquired stages.</p>	A-C
2013	Baten, K. (2013). <i>The Acquisition of the German Case System by Foreign Language</i>	This longitudinal study examined the acquisition of the German case system by Dutch-speaking foreign language learners in the framework of PT (PIENEMANN, 1998). The acquisition of the German case system had not yet been interpreted in terms of	A

<p><i>Learners</i>. Amsterdam: Benjamins.</p>	<p>theoretically motivated developmental sequences. Recall that the aim of the DiGS-research project was to describe stages and compare to teaching practice, and not intended to justify or falsify a particular SLA theory (DIEHL ET AL, 2000). The results of Baten's study showed that German case emerged along the lines of PT's processing procedures: In terms of feature unification Baten's study showed a development from unification within phrases (case use in prepositional phrases; stage 3) to unification beyond phrases (functional case use on the objects; stage 4); in terms of mapping, the study showed a development from linear mapping (case use in canonical sentences; stage 2) to non-linear mapping (case use on topicalized objects; stage 4).</p>	
<p>2015 Zhang, X. &amp; J. Lantolf, J. (2015). Natural or artificial: Is the route to L2 development teachable? <i>Language Learning</i>, 65, 152–190.</p>	<p>In their study on the L2 acquisition of Chinese topicalization, Zhang and Lantolf (2015) claim to have found counter-evidence to the teachability hypothesis, because their unready learners were able to skip a stage after a formal intervention that focused on the next + 1 stage. In the study, four learners received instruction on Chinese object topicalization (Stage 4, TOP<sub>obj</sub>-SV), even though these learners only produced Stage 2, SVO sentences on the pretest prior to instruction. On the posttest these learners were capable of producing Stage 4 sentences, but unable to produce Stage 3 ADJ+SVO sentences. However, the gap might be a diagnostic rather than a stage gap, because, as Keßler (2007<sup>3</sup>) pointed out, stage 3 structures can be hard to elicit if the learners have already progressed to stage 4. In addition, other concerns exist about the interpretation of the results in Zhang and Lantolf (2015). Pienemann (2015) questioned whether the non-use of Stage 3 sentences really provides evidence for the non-application of the rule, because the use of adjunct topicalization is actually non-obligatory in Chinese. This means that obligatory contexts cannot really be provided, and as a result, the non-use can only be classified as 'no evidence' (for non-application of the rule). In this regard, BATEN (2017) argued that a native speaker benchmark should have been added to the data in order to argue that a sufficient number of obligatory contexts was provided. Only if native speakers produce Stage 3 sentences, the argument can be substantiated. If native speakers do not produce Stage 3 sentences, the only logical conclusion is then that the task does not provide the context for adjunct topicalization (of course, it will not be assumed that the native speakers have not acquired the structure). In the same vein, it would have been useful to have data of learners of L2 Chinese producing sentences from all stages on the pretest. This would show that the data elicitation task used in the study was clear from the start and not only after the instruction. In addition, and more importation with regard to the</p>	<p>C</p>

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data interpretation, BATEN (2017) wondered whether the production of object topicalization can really be considered as Stage 4 inter-phrasal feature unification, because no other linguistic information (such as case markers, clitics, or V2) is needed to assume that TOP (as a discourse function) really is assigned to OBJ (as a grammatical function). This means that the TOP discourse function actually remains underspecified, and as a result it cannot be taken for granted that the learners make a connection between discourse function TOP and grammatical function OBJ.

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2017 Baten, K. (2017). Teaching the German Case System: A Comparison of Two Approaches to the Study of Learner Readiness. In A. Lenzing, H. Nicholas & J. Roos (Eds.), *Widening Contexts for Processability Theory: Theories and issues*. Amsterdam: John Benjamins.

This study examined the teachability hypothesis in relation to the developmental sequence found for German case acquisition (BATEN, 2013). In a pretest-posttest design 18 learners of L2 German received instruction on the functional case use on topicalized objects (Stage 4). The pretest revealed that 9 learners were at Stage 2 (unready learners) and 9 other learners were at Stage 3 (ready learners). The emergence analysis showed that four groups of learners can be distinguished. First, within the unready learners, one group of learners does not develop at all, they remain at the same stage (i.e., Stage 2). Another group of unready learners does develop, but only to the next stage (i.e., from Stage 2 to Stage 3). This result is comparable to earlier studies that also observed unready learners to benefit from instruction that was targeted at stages beyond the next stage (DOUGHTY, 1991; MACKEY, 1999; SPADA & LIGHTBOWN, 1999; BONILLA, 2015). Second, within the group of ready learners, one group of learners does not develop (i.e., they remain at Stage 3), and one group does develop (i.e., from Stage 3 to the targeted Stage 4). This pattern of results is in line with constraints of the teachability hypothesis. It should be noted that the unready learners who develop to Stage 3 do not skip a stage. Also, the ready who do not develop fall within the conception of processing constraints. Instruction that deals with the next stage does not always lead to emergence of the stage that was actually targeted. According to PT, the availability of certain processing skills does not imply that the linguistic structures corresponding to these processing skills will necessarily emerge.

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## Notes

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<sup>1</sup> ZISA stands for *Zweitspracherwerb italienischer und spanischer Arbeiter* (English: 'second language acquisition of Italian and Spanish guest workers').

<sup>2</sup> DiGS stands for *Deutsch in Genfer Schulen* (English: 'German in the schools of Geneva').